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ABSTRACT

The philosophy, major constraints, and strategy for curriculum development and implementation of a K-12 environmental education program are reviewed in this draft. Its purpose is to draw together some basic ideas and pertinent questions from leading educators, the literature, and successful environmental education programs, in an effort to provide a focus and point of departure in clarifying a comprehensive philosophy of environmental education and in applying the resulting concepts to the development of educational programs. Major emphasis is placed on strategy as a means of overcoming the indicated constraints. An 8-phase plan is offered. It involves reviewing literature regarding the theories of learning and instruction; creating an environmental education committee to develop, implement, and evaluate the program and facilitate communication; establishing goals and subgoals, objectives, curriculum organization, and the curriculum or instructional model; encouraging a comprehensive inservice teacher education program; and developing an instrument to evaluate the effectiveness of the environmental education program. Ideas for overcoming constraints and developing a reinforcing environment are also explored. (BL)

First Draft

Materials, Ideas, and Questions to Serve as a Basis for Preparing a Position Paper Regarding the Development and Implementation of Instructional Programs in Environmental Education (K-12)

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Materials, Ideas, and Questions to Serve as a Basis for Preparing a Position Paper Regarding the Development and Implementation of Instructional Programs in Environmental Education (K-12)

INTRODUCTION

The roots of the environmental education movement go back many years. However, its emergence into prominance has occurred only during the past seven years. During that time, many separate philosophies and definitions have appeared. Yet little effort has been made to integrate these diverse views and articulate a philosophy, with accompanying framework and guidelines, helpful to school systems interested in developing and implementing instructional programs in environmental education. Because such a philosophy is absent, many programs previously aligned under other educational "banners" (for example, nature education, outdoor education, conservation education, resource-use education, and others) have simply changed their names to environmental education but not modified their program focus or orientation.

A position paper can be a first step in clarifying a comprehensive philosophy of environmental education and in applying the resulting concepts to the development of educational programs.

The purpose of this preliminary document is to draw together some basic ideas and pertinent questions from leading educators, the literature, and successful environmental education programs, in an effort to provide a focus and a point of departure. Your thoughts and criticisms are essential in helping to formulate a truly useful position paper.

I. THE PHILOSOPHY OF ENVIRONMENTAL EDUCATION

The following questions can serve as a beginning framework for our efforts to develop a philosophy of environmental education. What are your thoughts on these questions? What other questions need to be raised?

1. Is the following working definition of environmental education satisfactory? How well does it harmonize with the answers we give to the remaining questions?

> Environmental education is the process that fosters greater understanding of society's environmental problems and also the processes of environmental problem-solving and decision-making. This is accomplished by teaching the ecological relationships and principles that underlie these problems and showing the nature of the possible alternative approaches and solutions.
>
> That is, the process of environmental education helps the learner perceive and understand environmental principles and problems, and enables him to identify and evaluate the possible alternative solutions to these problems and assess their benefits and risks. It involves the development of skills and insights needed to understand the structure, requirements, and impact of interactions within and among various environmental entities, subsystems, and systems.
>
> --Handbook, Office of Environmental Education, USOE, 1973

2. What should be the major goals and objectives of environmental education?

3. How broad in scope should environmental education be?

4. What shouldn't environmental education include?

5. What areas should be priorities?
6. Should environmental education be both content and process in orientation? If so, what content and what processes?
7. What fields should environmental education draw upon?
8. What are the specific contributions of each field to environmental education?

II. THE MAJOR CONSTRAINTS TO DEVELOPING AND IMPLEMENTING AN ENVIRONMENTAL EDUCATION PROGRAM (K-12)

Many constraints confronting environmental education are not unique -- they are inherent in the American educational system. We must identify these constraints and team with other educators to solve common problems. At least four major constraints need to be recognized and remedies recommended.

First, as the learner proceeds from kindergarten through the twelfth grade, educational material is increasingly organized around disciplines and little emphasis is placed on problem-solving. This presents a constraint because environmental education is an inter-disciplinary, problem-solving approach. This constraint may have to be faced for some time, as the problem-solving approach may need

to become an integral part of collegiate education before it can be successful at the elementary and secondary level.

Second, the curriculum is already crowded with subject matter material; hence it is difficult to persuade administrators to incorporate additional areas of study into the school day. This can be countered by indicating that environmental education can link subject matter fields and reinforce the existing curriculum. Environmental education also provides relevance for existing curricular material.

Third, environmental education cannot avoid value questions. However, many public schools have steered clear of value discussions particularly those that run counter to community norms and attitudes. It is generally accepted that teachers should not inculcate their own values into the minds of students. However, environmental education advocates a value clarification process. This process does not teach a particular set of values. Rather, it stimulates an individual to examine his behavior by clarifying for himself his purposes, beliefs, attitudes, and other value indicators.

Fourth, there is a severe shortage of classroom teachers prepared to effectively integrate environmental education into instructional programs. The traditional approach to the teaching of environmental matters has been for the teacher to become knowledgeable about some aspect of the environment and then lecture the student in order to transfer this knowledge to him. This process has not stimulated interest in environmental issues or helped

students acquire beliefs, attitudes, values, or skills conducive to the development of an environmentally literate citizenry. Several leading environmental educators have advocated an approach whereby the teacher encourages class members to investigate their community environment in an effort to reinforce classroom material and to provide a working knowledge of the human ecosystem. This represents a departure from a "read and discuss" method. Class members view the environment first-hand, attend public hearings, gather relevant information, consider alternative solutions to problems, and advocate solutions through appropriate channels. The teacher's role is not to lecture about the environment but instead to assist class members in acquiring information relevant to their environmental concerns.

Other constraints affecting the success of an environmental education program are: inflexible scheduling; resistance and apathy on the part of the community, administrators, teachers, or students; lack of community reinforcement by parents, youth groups, peers, and church; funding constraints for busing, materials, facilities, or personnel; lack of information on the community environment, such as government, housing, solid waste, power generation, water pollution, air pollution, noise pollution, waste water treatment, transportation, and recreation; or the lack of guidelines for the teacher in carrying out an environmental education program, such as guidelines for handling values clarification, controversial topics, or social change strategies.

The constraints listed above are typical of most school systems. All environmental education programs should be evaluated, the problems identified, and a strategy outlined to overcome the constraints. Many of the problems confronting an environmental education program are similar to those affecting the success of other instructional programs. For this reason, coalitions of administrators, teachers, students, and community citizens should be formed to find ways to overcome mutual problems and to meet the needs of youth.

III. STRATEGY FOR CURRICULUM DEVELOPMENT AND IMPLEMENTATION IN ENVIRONMENTAL EDUCATION (K-12)

To overcome the constraints outlined above, it is imperative that a strategy for curriculum development, implementation, and evaluation be developed. The following is a strategy that has been effective in establishing environmental education programs. What is your reaction to this strategy? How might the strategy be modified to make it more universally acceptable?

Phase 1: Establish an environmental education committee to develop, implement, and evaluate the program and to facilitate communication.

An essential component is effective communication between the community and the school system. The introduction of an environmental education program requires the involvement and preparation

of the community, administration, teaching staff, students, and the school supportive staff.

The environmental education committee should include administrators, teachers from various grade levels and subjects, students, and citizens representing various community interests.

Important duties of an environmental education committee are to.

1. Assist in the development of the philosophy and operating structure of the program;
2. Identify the changes needed to fully implement the program;
3. Identify the power structure of the school system and community;
4. Develop a strategy to implement the program;
5. Implement the program;
6. Administer the program;
7. Evaluate the effectiveness of the program in achieving stated goals and objectives.

In developing an environmental education program for a school system, an environmental education consultant should be retained by the school. The consultant provides the leadership and guidance essential to the success of the program.

Phase 2: Establish the goals and subgoals of the environmental education program.

Without a clear statement of goals, a program would become a series of unrelated experiences, focusing on limited program objectives.

The general goal of an environmental education program might

be as follows:

Goal: To produce a citizenry that is knowledgeable concerning the total environment and its associated problems, aware and skilled in how to become involved in helping to solve these problems, and motivated to work toward their solution.

Major subgoals might be:

Affective Subgoal: To help individuals acquire strong feelings fundemental to developing a concern for the environment and a motivation to participate in activities for maintaining and improving the quality of the environment.

Cognitive Subgoal: To help individuals acquire basic understanding of the total environment and associated environmental problems.

Behavioral-Skill Subgoal: To help individuals develop thinking and action skills for the prevention of environmental degradiation, and for the correction of environmental abuses.

Phase 3: Establish the objectives of the environmental education program.

There are various ways to state the expected and the desired outcomes of an environmental education program. Perhaps the most significant and dynamic approach is in terms of behavioral predispositions. In other words, the product of the environmental education program (K-12) should be a citizen who is:

1. Interested in his environment and its relationship to society;
2. Sensitive (total awareness) to his environment, both natural and man-made aspects of it;
3. Sensitive to the dimension of quality of his environment and able to recognize environmental problems;

4. Inclined to participate in coping with environmental problems.

Phase 4: Review the literature regarding theories of learning and instruction that apply to the formulation, implementation, and evaluation of an environmental education program.

A recent review of the literature reveals the following points that should be considered in the formulation of any environmental education program:

1. Behaviors that are reinforced are most likely to recur. It is important that desired behaviors be reinforced by the home, school, church, youth organizations, and so on;
2. The most effective effort is put forth by youth when they try tasks that fall in the "range of challenge" -- not too easy and not too hard -- where success seems likely but not certain;
3. Youth are most likely to throw themselves wholeheartedly into any project if they themselves have a meaningful role in the selection and planning of the enterprise,
4. Reaction to excessive direction of the teacher is likely to be: apathetic conformity; defiance; escape from the whole affair;
5. What is learned is most likely to be available for use if it is acquired immediately preceding the time when it is needed. Learning in youth, then forgetting, and then relearning when need arises is not an efficient procedure.

6. The learning process in school ought to involve dynamic methods of inquiry;
7. Learning takes place through the active behavior of the student. It is what he does that he learns, not what the teacher does. The essential means of an education are the experiences provided, not the things to which the student is merely exposed;
8. One of the keys to motivation is a sense of excitement about discovering for oneself, rather than having a generalization presented by a teacher and requiring a student to prove it;
9. Helping citizens to acquire technical knowledge alone regarding an environmental problem may not increase their concern for the problem;
10. Citizens are more likely to become involved in environmental issues if they are aware of how they can have some effect upon decision-making.

Phase 5: Establish the curriculum organization of the environmental education program.

An important criticism of our public school system is the lack of adequate communication between the various divisions of the school organization. Instead of well-developed series of instructional units and activities commencing at the kindergarten level and terminating in the twelfth grade, many school systems present a series of units

that have little relationship between what has previously been taught and what will be taught in the future. The K-12 approach is the most sound way to plan a curriculum for environmental education.

Curriculum projects should be planned horizontally as well as vertically. Disciplines, such as science and social studies, should not be studied in isolation; they should be planned so students can see the contributions of interdisciplinary studies in assisting the learner to understand and solve environmental problems.

Furthermore, a curriculum program should recognize individual differences. No sequence meets the needs of all students. Therefore, a curriculum should be flexible so material can be presented according to the background, needs, and aspirations of the students.

The following guidelines are useful in developing an environmental education program. The program should:

1. Span the curriculum -- kindergarten through twelfth grade -- so environmental experiences can be presented at every grade level, thereby capitalizing on cumulative effects of the program;
2. Link subject areas that relate most closely to the environment, especially science and social studies, so that both the social and scientific knowledge important in understanding and solving environmental problems are properly developed;
3. Integrate and correlate the program with the existing

curriculum in a manner that enhances instructional goals;

4. Strive to increase the learner's interest in, awareness of, and sensitivity toward the environment;
5. Be participant centered -- the learner should play an active role in the learning process and should develop attitudes through personal expeiences and thinking and not only through the presentation of predigested conclusions;
6. Focus on the local environment, but do not neglect state, national, and international environmental issues.
7. Focus on contemporary issues in a process-oriented approach;
8. Stress attitudes formation, values clarification, and skill-behavior (critical thinking, problem-solving, and social change strategies);
9. Focus on the future of mankind with a global orientation (spaceship earth philosophy);
10. Provide a comprehensive in-service teacher education program that would operate throughout the school year and that would be directed at assisting teachers to increase their understanding, interest, awareness, and teaching skills in environmental affairs and that would involve teachers in curriculum development.

Phase 6: Establish the curriculum (instructional model) of the environmental education program.

Successful environmental education programs can be based on different models. The model described below is action oriented and encompasses many aspects advocated by leading environmental educators. The model consists of five integral parts: philosophy and concepts; processes; emphases; teaching models; and sensitivity guidelines. What is your general reaction to the instructional model? What specific recommendations do you have?

Part 1: Philosophy and Concepts (Big Ideas)

An environmental education program should assist the learner in understanding the basic philosophy of "spaceship earth." This philosophy is an appropriate framework for a program because its concepts are basic and essential to environmental education. Furthermore, the concepts of spaceship earth can be understood by students at all grade levels. The philosophy of spaceship earth should be the "umbrella" for an environmental education program. Some concepts that undergird and support this philosophy are briefly described below:

Closed System: We live in a relatively closed life-support system (notable exceptions are solar energy, cosmic radiation, and meteorites). We have on our spaceship earth all the air, water, and land we will ever have --- space and resources are limited.

Ecosystem: Living organisms and their nonliving environment are inseparably interrelated and interact upon each other. The exchange of material between the living and nonliving parts follow circular paths. The relationships are complex and extremely vulnerable to sudden or long-term disturbances.

Human Ecosystem: Man must have a clear understanding that he is an inseparable part of a system, consisting of man, culture, and the biophysical environment, and that he has the ability to alter the interrelationships of this system either constructively or destructively.

Land and Human Ethics: Man must develop an ecological conscience toward the environment that reflects a commitment of individual and group responsibiity to future generations, an ethic where man is not a conqueror of the land community but a citizen of it. Only when each person and community acts in a responsibie, ecologically conscious manner will we be able to live in harmony with, and within, our environment.

It is important, however, that man also possess a human ethic. Men who do not have a human ethic are not likely to possess a land ethic. There is a relationship betweeen these two ethics and both are essential if man is to live compatibly on and compatibly with spaceship earth.

Population: Our earth is threatened and challenged by our rapidly increasing human population. The most common form of overpopulation involves not too many people for available space, but too many people for available resources, or too many people for the proper functioning of society.

Environmental Contamination: Increasing human population, rising levels of consumption, and the resultant demands for greater industrial and agricultural productivity inevitably result in increasing environmental contamination. Man must add the concept of recycling for our spaceship system, for the residuals of production not only pollute the system, but contribute to the depletion of valuable resources.

Environmental Quality: Man must develop attitudes of concern for the quality of the environment, in terms of both physical and psychological effects, which will motivate him to participate in environmental problem-solving (such as environmental planning).

Environmental Decisions: If man is to live harmoniously within his fragile environment, he must rethink consumer and corporate behavioral patterns as well as government policies. New behavioral patterns and policies need to reflect an emerging ethic where man is a steward of his environment. The environmental decisions in each of these three arenas should represent collective interests and should be based on long-term environmental benefits.

Part 2: Processes Basic to Environmental Education

Two basic processes that are an integral part of environmental education are problem solving and valuing. These two processes relate to each other and assist the learner in developing skills in the areas of:problem definition; data collecting, organizing, and analyzing; generating alternative solutions; evaluating alternative solutions; and developing and implementing plans of action. These processes also help the learner to develop skills of critical thinking, planned social change, and communication.

A basic component of the action-oriented model is community problem-solving. Recommended steps in this sequence are:

1. Identifying and defining the environmental issue or problem;
2. Collecting, organizing, and analyzing data related to the problem;
3. Generating and evaluating alternative solutions;
4. Selecting the best solutions generated;
5. Developing a plan of action;
6. Implementing the plan of action;
7. Evaluating the implementation process.

By utilizing the problem-solving process, students acquire skills and knowledge important in dealing with environmental problems relevant to them. Once these skills are acquired, they can be used to confront future environmental issues.

Community problem solving provides an excellent opportunity for

the valuing process to occur. The values clarification process advocated by Raths, Harmin, and Simon includes the three action aspects of choosing, prizing, and acting. The steps advocated in the values clarification process are:

1. Students are presented with an issue.
2. Students suggest alternative solutions.
3. Students consider the consequences of each alternative.
4. Students express their feelings about each alternative.
5. Students make a free choice based on personal values.

Values clarification should be a basic part of every environmental education program. Values clarification stimulates an individual to examine his behavior by clarifying for himself his purpose, beliefs, attitudes, and other value indicators. It helps to alleviate and remove the inconsistencies that exist in an individual's life and encourages the development of self-concept. Values clarification is of paramount importance in making rational environmental decisions every day of a person's life.

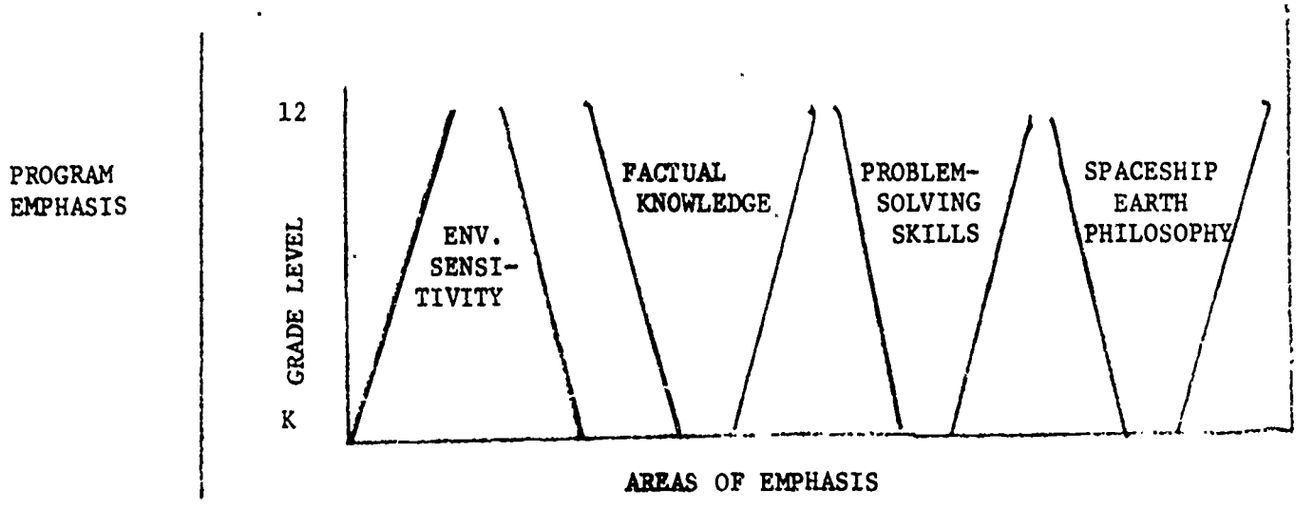
Part 3: Emphasis of Program at Different Age Levels

Environmental education activities at each grade level should focus on the affective (feeling), cognitive (knowing), and skill-behavior domains. Emphasis in the early years, however, should be in the affective domain and in the later years on the cognitive and skill-behavioral domain. The learner should also be provided with opportunities to explore his immediate environment with all of

his senses -- sight, hearing, smell, touch, and taste. The learner should be exposed to a variety of environments in order to have experiences to judge the quality of his immediate environment. For example, an inner-city child who has never experienced clean, unpolluted water, health trees, and rich soil, may not have a "measuring stick" by which to judge his home environment. Likewise, a rural child may accept his rather pristine environment, not knowing that it can be degraded if people are not active in maintaining a quality environment.

If a child learns to appreciate and respect environmental resources, he may want to learn more and be willing to protect what he appreciates. Many programs emphasize knowledge rather than feelings in the early years. This is less likely to produce an individual who strives for more knowledge or has a motivating concern that will result in a tendency to act if the environment becomes degraded.

The recommended emphases for an environmental education program are outlined below:



Part 4: Teaching Models

There is no teaching model that all students will respond favorably toward under all circumstances. Some students learn best when the teacher is acting as a conveyor of information. Other students learn best when there is an atmosphere of strong teacher-student interaction. It is important for a teacher to assess his/her personal skills and the situation and then blend teaching models in an effort to achieve the best learning environment.

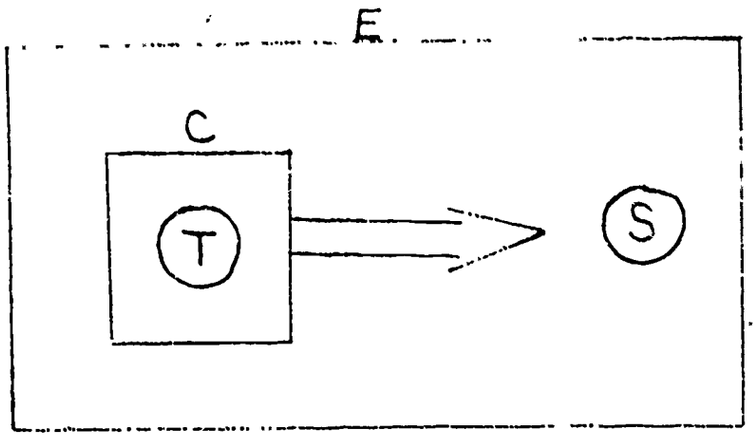
The teaching model traditionally employed in most American classrooms is characterized by a teacher that digests a predetermined body of information and then conveys this material to the student. This role is illustrated by figure 1. When the teacher functions in this role, the content and the subject matter have already been determined by publishers, committees, administrators, or school board members. The teacher becomes familiar with the content and then assumes the role of expert in conveying this information to the student. The student is presumed to have few attitudes or thoughts about the content until after the unit has been completed. The virtue of this model -- or teaching based on it -- is that it is neat, tight, controlled, and orderly. Its disadvantage is that it is not very effective in achieving the outcomes sought by the action-oriented model being discussed in this section.

The amount of information available on the environment and the recent demand of students for relevancy in educational programs calls for a new teaching model, a model where the teacher does not serve

as the principle source of information. The role of the teacher is to create a learning environment, assist students in acquiring information, provide guidance to the student, and to participate with the student in the learning process.

Research studies have shown that teachers are highly effective when they participate in learning projects as "team members," guides, and counselors, rather than as star performers. This means that many of the functions traditionally regarded as the prerogative of the teacher should be conducted by the students. Decisions on which activities will be pursued, and by whom, should be determined by the students, with advice and guidance from the teacher. This concept of the role of the teacher is illustrated by figure 2.

The various aspects of the model discussed in this section are illustrated by figure 3.



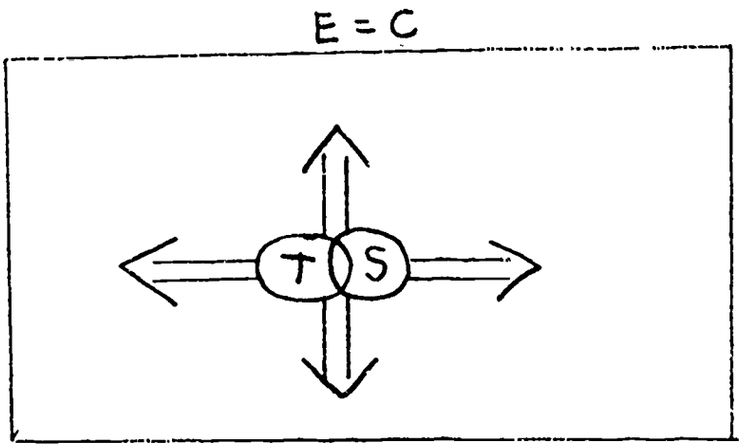
E = Environment

C = Content

T = Teacher

S = Student

Figure 1: TEACHER AS CONVEYER OF INFORMATION



E = Environment

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Figure 2: TEACHER-STUDENT INTERACTION

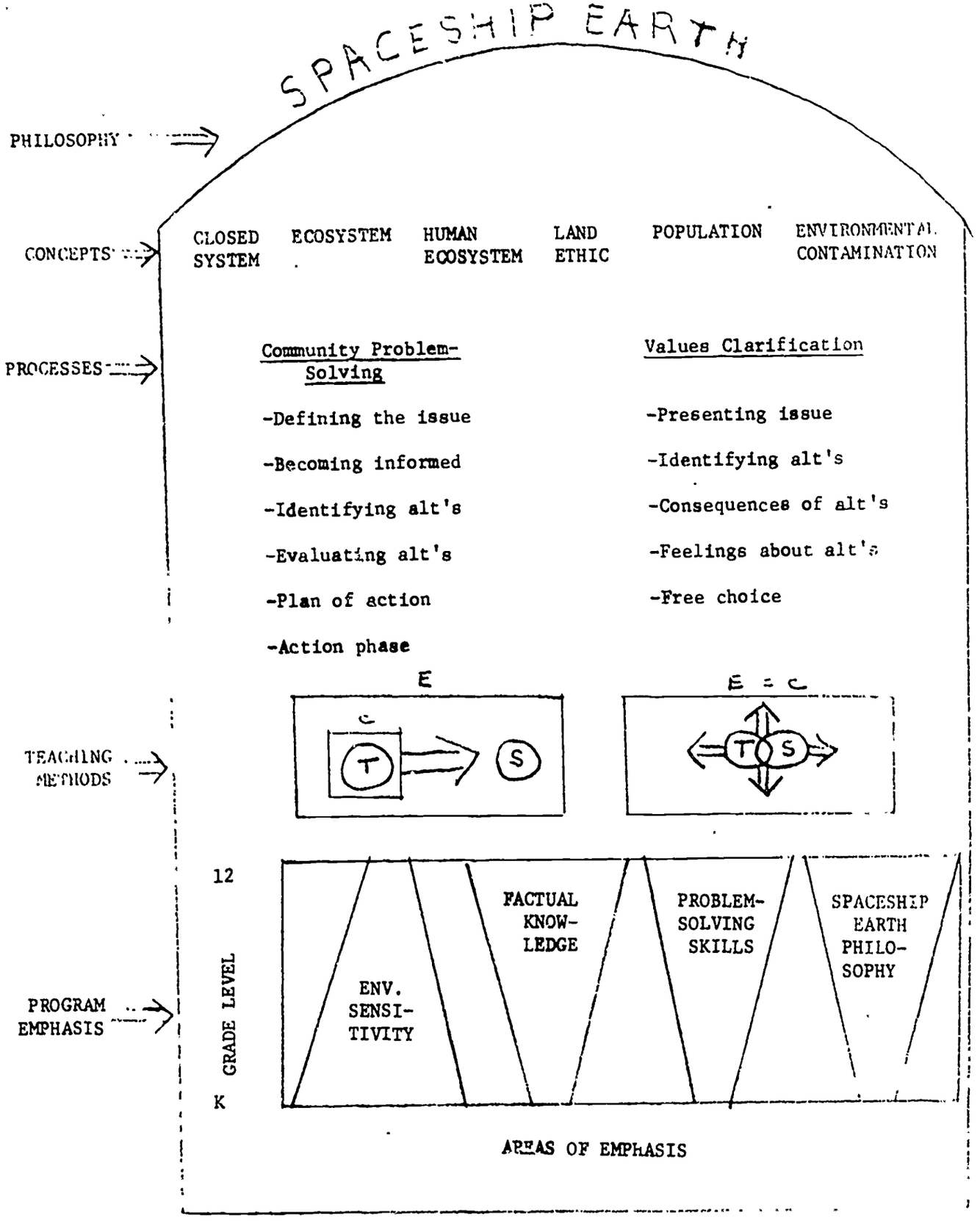

Figure 3: ENVIRONMENTAL EDUCATION MODEL

Part 5: Sensitivity Guidelines for Students Entering a Community to Work on Local Environmental Problems

Students entering a community to work toward the solution of local environmental problems should receive intrapersonal and interpersonal training. It is also important that consideration be given to the process of identifying, selecting, and implementing community action projects. The following guidelines have been developed for these purposes.

1. Students involved in community action projects

   a. Be aware of your personal values (e.g., elitism-classism, racism, sexism, ageism, etc.) and arrange for training sessions to work on value conflicts.

   b. Be aware of personal values that might be different from the values of the community sector that you will be working with. Arrange for training sessions to work on value conflicts and to foster value sensitivity.

   c. Be aware of interpersonal relationships and arrange for training sessions to work on problem areas (personality barriers, working relationships, etc.).

   d. Be aware of the resources that you and each of the other members bring to the team.

2. Sensitivity toward the community

   a. Do not enter the community like gangbusters.

   b. Be a good community listener.

   c. Do not seek to replace existing community leaders. They will be there long after you leave.

   d. Be informed about the community (the people, the government, politics, functioning of community, living conditions, environmental status, concerns of the residents, etc.)

   e. Be aware of and work with community people and organizations that have the resources and past experience to assist you in your community problem-solving project.

3. Identifying community projects

   a. Obtain ideas from students, faculty, school administration, citizens, government officials

   b. Attend public hearings and meetings.

   c. Read community newspapers and newsletters.

   d. Listen to local public-affairs radio and tv programs.

4. Selection of community action projects

   a. Review all community projects identified through process 3 (above).

   b. Make your project selection after considering items such as student interest in project, student and

community priorities, available resources, funding, risks involved (personal, class, school, etc.), school board policy, and the social implications of the work you are planning in that community.

5. Implementing community action projects

a. Involve the learner; do not be leader-centered.

b. Be a facilitator, not a commentator.

c. Give credit where credit is due; practice humbleness.

d. Be aware of the social implications of your actions.

e. Develop strong ties with community individuals and organizations in order to build your power base and to provide on-going support for the project.

Phase 7: Establishing a Comprehensive In-service Teacher Education Program.

To assist youth in acquiring a working knowledge of the spaceship earth philosophy, and attitudes and skills essential in helping to resolve environmental problems, teacher education programs must be an integral part of an environmental education program.

The thrust of such a program should be toward a system aimed at helping teachers to acquire the knowledge and skills that will enable them to do the following:

1. Successfully explore relevant environmental issues with students;

2. Encourage students to express their feelings, perceptions, and ideas;
3. Foster an atmosphere where information and ideas can be freely expressed and exchanged and the views of individuals and organizations heard and respected;
4. Assist class members to analyze and clarify personal values;
5. Serve as a resource person in assisting students in acquiring information;
6. Assist in the implementation of appropriate solutions devised by students.

In handling inservice teacher education workshops, teachers should be involved not only in discussing various matters concerning environmental education, but involved in researching and developing guidelines and instructional materials related to the program.

In developing an in-service teacher education program, the following should be considered:

1. Orientation sessions for all teachers and administrators as to the philosophy and structure of the environmental education program.
2. Involvement of teachers at all grade levels and subject areas.
3. Discussion and development of written guidelines:
    a. On ways to integrate environmental education into the existing curriculum;

b. On the role of the teacher and student in selecting, planning, and executing environmental education activities;

c. On the school system's administrative policies and procedures that relate to environmental education;

d. On handling value analysis and clarification;

e. On handling controversial issues;

f. To consider in effecting social change; and

g. For developing and utilizing school sites.

4. Development of written materials and instructional aids to assist teachers in understanding and presenting environmental information;

5. Training sessions designed to assist teachers in handling topics, such as: values, community problem-solving, and community sensitivity;

6. Distribution of a monthly newsletter to teachers and administrators regarding information relevant to environmental education;

7. Arrangement for educational experiences to occur on school sites and in the neighborhood and community;

8. Development of a series of booklets containing information (environmental inventory) on the local community in areas such as government; housing; solid waste; water resources; air resources; waste water treatment; recreation; urban trees; etc. The following information should be included for <u>each</u> topic: basic information; problems

and alternative solutions; field trips and tour opportunities; local resource people; instructional aids (films, filmstrips, slides, environmental games and simulations, environmental kits, overlays, etc.), and other helpful information. The material should be produced in local workshops by teachers and students working as teams, and made available to students, teachers, and administrators throughout the school system;

9. Providing the opportunity for teachers and students to communicate to parents and the community regarding the philosophy and operation of the environmental education program; and

10. Promotion of local collegiate offerings and adult education programs for teachers interested in furthering their training in environmental education.

The first phase of the in-service teacher training program should be to orient all teachers and administrators to the philosophy, structure, and operation of the environmental education program.

The second phase of the in-service teacher training program should be to plan tours of the community to provide teachers and administrators with first-hand experiences regarding their local environment and associated problems. Discussion should center on the local environment with an examination of relevant issues from an ecological, economic, political, social, and technological point of view. Emphasis should also be on ways to integrate community environmental studies into the school program. Information should be distributed regarding the names of community citizens and governmental officials

knowledgeable on the environment and available to serve the school system as resource persons.

The third phase of the inservice teacher training program should be to offer a series of teacher-student workshops to discuss, research, and produce written guidelines and materials designed to assist teachers in implementing the goals and objectives of the environmental education program.

The fourth phase of the inservice teacher education program should be to offer a series of teacher-student workshops on special topics, such as values, community problem-solving, community sensitivity, and school site development and usage.

Phase 8: Develop an Instrument to Evaluate the Effectiveness of the Environmental Education Program.

It is imperative that environmental education programs be evaluated periodically to determine if the expressed goals and objectives of the program are being achieved. The results of the evaluation should be fed back so that the program can be modified to reflect information derived from the evaluative instruments.

In developing evaluative instruments for an environmental education program, a local environmental education committee should screen evaluation programs that have already been developed and tested. Some instruments that have been developed for detecting student and teacher changes relating to environmental education are: environmental mapping, environmental knowledge, environmental feelings, values, skill-behavior (critical thinking and problem-solving),

exploratory behavior, and self-concept. A very well designed instrument for evaluating a comprehensive environmental education program in Yarmouth, Maine, was developed by Dean Bennett. This instrument could be modified to meet the needs of many environmental education programs. It is important that the evaluative instruments be as objective, reliable, and valid as possible.

IV. STRATEGY TO OVERCOME CONSTRAINTS

To help overcome any constraints to the full implementation of an environmental education program, it is recommended that the environmental education committee identify constraints and make appropriate recommendations to overcome each constraint. The recommendation should be made to the proper body (board of education, superintendent, curriculum committee, principals, etc.).

In developing an appropriate strategy, it is recommended that the environmental education committee utilize a "force field analysis." This is a process by which resources (self, others, situation) and resistances (self, others, situation) are identified and a strategy devised to utilize one's resources to overcome resistances.

V. DEVELOPING A REINFORCING ENVIRONMENT

It is imperative to keep in mind that to change an individual's attitudes, values, and behavioral patterns, a very strong and

reinforcing environment is usually required. For this reason, it is vital that the environmental education committee work with all components of the community to identify ways that each component can assist the school system in achieving their stated environmental education goals. It is also important that each component group make an assessment of their own program in an effort to strengthen their environmental education contribution to the entire community (such as sponsoring seminars, producing materials, providing tours, giving presentations, offering technical assistance, providing services, etc.). In this manner, as youth and adults circulate daily in their community, they will be touched by environmental concerns from many sources. Some important component groups in most communities that have a great deal to offer to the environmental education movement are: agencies, agriculture, business, churches, citizen organizations, elementary and secondary education, government, higher education, industry, labor, pre-school, and youth organizations.

SUMMARY

This paper is intended to serve as a resource for school systems interested in developing comprehensive and effective environmental education programs. The ideas presented should assist youth in becoming more knowledgeable concerning the total environment and associated problems, more aware and more skilled in how to become involved in helping to solve these problems, and more highly motivated to work toward their solution.

This approach would assure that all students would be exposed to an array of environmental issues and possible solutions. Integrated into existing subject areas, relevancy would be provided to school programs and classes would be practically immune to the expulsion that frequently threatens new courses when funds are limited. Moreoever, this approach fits into existing courses without restructuring of the curriculum.

To implement this instructional program into a school system (K-12), it is important that an environmental education committee be formed to provide the leadership, teacher training, and supportive services essential to the program's success. To assist the teacher in implementing the instructional model discussed in this paper, the role of the environmental education committee would be to help provide the supporting services (human, instructional, fiscal, etc.) essential to the success of the program. Some important supporting services

include written guidelines (ways to integrate environmental education into the instructional program, role of teacher and student, ways to handle problem solving and values clarification, etc.), teacher training sessions (values, community problem solving, community sensitivity, etc.), and assisting teachers to overcome important constraints to the full implementation of the environmental education program.

The role of the classroom teacher is to expose the learner to his/her community environment in an effort to identify community environmental interests and concerns. Once students have identified these interests and concerns, the role of the teacher is to assist class members in working through the processes of community problem solving and values clarification as they relate to the topics of high interest and concern of the youth. In this process, the students should be developing attitudes (knowledge and feelings), values, and skills important in producing environmentally literate citizens.

An important school-wide program objective would be to have each student at every grade level exposed to the processes of community problem solving and values clarification sometime during the school year. The timing of this exposure would depend on the judgment of the class.

If an environmental education program revolved around community problem-solving and values clarification, a twelfth grader might not be exposed to all aspects of the environment. However, with the community problem-solving approach advocated

by this system, a twelfth grader who had been exposed to this program should be more sensitive (total awareness) to his environment, better able to recognize environmental problems, more sophisticated in the use of problem-solving skills essential to the solution of emerging environmental problems, and more inclined to participate in dealing with environmental problems than the student who is exposed to conventional forms of instruction. Also the learner would have an understanding and appreciation of the importance of relating ecological, economic, social, technological, and political information in solving present or future environmental problems.

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